

**Q (1)**

(a) Find all values of  $z$  such that  $\cosh z = 1 + i$

(b) Find an analytic function whose real part is  $U(x, y) = x^3y - y^3x$ .

(c) Evaluate (i)  $\oint_C \frac{\sin(\pi z^2)}{(z-1)^2(z-2)} dz$  where  $C$  is the circle  $|z| = 3$

(ii)  $\oint_C \frac{\cosh(\frac{3}{z-1})}{(z-1)(z-3)} dz$  where  $C$  is the circle  $|z| = 5$

**Q (2)**

(a) Define the convex fuzzy set and determine whether the following fuzzy sets are convex or not  $A = \int \frac{\mu_A(x)}{x}$ ,  $\mu_A(x) = \begin{cases} 0 & x \leq 4 \\ \frac{1}{1+(x-4)^{-2}} & x > 4 \end{cases}$  then determine  $\alpha$ -cut sets of the above set for  $\alpha = 0.5$  and  $\alpha = 0.9$ .

(b) A product with memberships represents, degree of high expensive  $\mu_A(x)$ , degree of medium expensive  $\mu_B(x)$  and degree of cheap expensive  $\mu_C(x)$ . Use defuzzification methods to find suitable price if its cheap degree is 0.2, its medium degree is 0.5 and high degree 0.7 where

